

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

Claims 1-26 (Cancelled)

Claims 27-53 (Cancelled)

Claim 54 (New) Process for the production of ergosterol and its intermediate products, characterized in that

- a) first a plasmid is designed, into which several suitable genes of the ergosterol metabolic process are inserted in altered form, wherein
the catalytic area of HMG is expressed without its membrane-bonded domain; and
the natural promoter of the gene t-HMG, ERG9 and SAT1 is replaced by the middle part of ADH1 promoter,

in this case, the suitable genes are selected from the following group:

- a-i) first a plasmid is designed, into which the following genes are inserted:

- i) the gene of the HMG-Co-A-reductase (t-HMG),
- ii) the gene of the squalene synthetase (ERG9),
- iii) the gene of the acyl-CoA; sterol-acyltransferase (SAT1), and
- iv) the gene of squalene epoxidase (ERG1),

or

- a-ii) first a plasmid is designed, into which the following genes are inserted:

- i) the gene of HMG-Co-A-reductase (t-HMG), and
- ii) the gene of the squalene synthetase (ERG9),

or

a-iii) first a plasmid is designed, into which the following genes are inserted:

i) the gene of the HMG-Co-A-reductase (t-HMG),

and

iii) the gene of the acyl-CoA: sterol-acyltransferase (SAT1),

or

a-iv) first a plasmid is designed, into which the following genes are inserted:

i) the gene of the HMG-Co-A-reductase (t-HMG),

and

iv) the gene of squalene epoxidase (ERG1),

or

a-v) first a plasmid is designed, into which the following genes are inserted:

ii) the gene of squalene synthetase (ERG9),

and

iii) the gene of acyl-CoA: sterol-acyltransferase (SAT1)

or

a-vi) first a plasmid is designed, into which the following genes are inserted:

ii) the gene of squalene synthetase (ERG9),

and

iv) the gene of squalene epoxidase (ERG1),

or

a-vii) first a plasmid is designed, into which the following genes are inserted:

- iii) the gene of acyl-coA: sterol-acyltransferase (SAT1)
- and
- v) the gene of squalene epoxidase (ERG1),
- or
- b) first plasmids are designed, into which in each case one of the genes of the genes mentioned under a-i) is inserted,
- and
- c) microorganisms are transformed with the thus produced plasmids, whereby the microorganisms are transformed with a plasmid under a-i) to a-vii) or are transformed simultaneously or in succession with several plasmids under b),
- d) fermentation into ergosterol is performed with the thus produced microorganisms,
- e) after fermentation is completed, the ergosterol and its intermediate products are extracted from the cells and analyzed and ultimately
- f) the thus obtained ergosterol and its intermediate products are purified by means of column chromatography and isolated.

Claim 55 (New) Process according to claim 1, wherein in addition, the gene of squalene epoxidase (*ERG1*) is inserted into the plasmid under a-ii), a-iii), and a-v), and in addition, the gene of acyl-CoA: sterol-acyl-transferase is inserted into the plasmid a-ii).

Claim 56 (New) Process for the production of ergosterol and its intermediate products, wherein the genes mentioned in claim 1 under a-i) to a-vii) and the genes mentioned in claim 2 under a-ii), a-iii) and a-v) are first introduced with the plasmids, in each case independently of one another, into microorganisms of the same species, and fermentation into ergosterol is performed together with the latter, and the thus obtained ergosterol is extracted from the cells, analyzed and purified by means of column chromatography and isolated.

Claim 57 (New) Process according to claims 1 to 3, wherein the intermediate products are squalene, farnesol, geraniol, lanosterol, zymosterol, 4,4-dimethylzymosterol, 4-methylzymosterol, ergost-7-enol and ergosta-5,7-dienol.

Claim 58 (New) Process according to claims 1 to 3, wherein the intermediate products are sterols with 5,7-diene structure.

Claim 59 (New) Process according to claims 1 to 3, wherein the plasmids are the plasmids YEpH2, YDpUHK3 and pADL-SAT1.

Claim 60 (New) Process according to claims 1 to 3, wherein the microorganisms are yeasts.

Claim 61 (New) Process according to claim 7, wherein it is the species *S. carevisiee*.

Claim 62 (New) Process according to claim 8, wherein it is the strain *S. carevisiee* AH22.

Claim 63 (New) Yeast strain *S. cerevisiae* AH22, containing one or more of the genes mentioned in the process under a-i).

Claim 64 (New) Plasmid pADL-SAT1, consisting of the *SAT1* gene and the *LEU2* gene from YEp13.

Claim 65 (New) Use of the plasmids according to claim 11 for the production of ergosterol.

Claim 66 (New) Use of the plasmids according to claim 11 for the production of ergosterol intermediate products squalene, farnesol, geraniol, lanosterol, zymosterol, 4,4-dimethylzymosterol, 4-methylzymosterol, ergost-7-enol and ergosta-5,7-dienol.

Claim 67 (New) Use of the plasmids according to claim 11 for the production of sterols with 5,7-diene structure.

Claim 68 (New) Expression cassette that comprises the average *ADH* promoter, the *t-HMG* gene, the *TRP* terminator and the *SAT1* gene with the average *ADH* promoter and the *TRP* terminator.

Claim 69 (New) Expression cassettes, comprising the average *ADH* promoter, the *t-HMG* gene, the *TRP* terminator, the *SAT1* gene with the average *ADH* promoter, and the *TRP* terminator, and the *ERG9* gene with the average *ADH* promoter and the *TRP* terminator.

Claim 70 (New) Combination that consists of expression cassettes, and the combination that consists of

- a) a first expression cassette, on which the *ADH* promoter, the *t-HMG* gene and the *TRP* terminator are located,
 - b) a second expression cassette, on which the *ADH* promoter, the *SAT1* gene and the *TRP* terminator are located,
- and
- c) a third expression cassette, on which the *ADH* promoter, the *ERG9* gene with the *TRP* terminator are located.

Claim 71 (New) Use of the expression cassettes according to claims 15 to 17 for transformation of microorganisms that are used in fermentation into ergosterol.

Claim 72 (New) Use according to claim 18, wherein the microorganism is yeast.

Claim 73 (New) Microorganisms that contain expression cassettes according to claims 15 to 17.

Claim 74 (New) Microorganism according to claim 20, wherein it is yeast.

Claim 75 (New) Use of the microorganism according to claims 20 and 21 with fermentation into ergosterol.

Claim 76 (New) Use of the microorganism according to claims 20 and 21 with
fermentation into ergosterol intermediate products.